CLIMATE GOAL QUARTERLY NEWSLETTER

On August 17, GFDL in Princeton, NJ hosted a Roundtable on "Applying Models of Global Climate Change to Natural Resources Management." It was an initial discussion between a diverse group of natural resource managers and climate scientists interested in the application of climate change information to improve natural resource science and management decisions. Attendees of the meeting included: NOAA, DOI, USDA, NASA, EPA, NSF, DOE and members of the University and NGO community. This meeting was initiated during ongoing discussions between NOAA, DOI, and USDA on their climate information needs. The meeting was a two-way exchange about modeling requirements, data availability, applications, limitations, and land and water resource management needs ahead of the upcoming "Advanced Climate Modeling and Decision-Making in Support of Climate Services" meeting that was held in Aspen, Colorado, September 21-25. The one-day workshop was co-sponsored by NOAA, DOI, and USDA.

Spotlight on Climate Observations & Monitoring Program

The *OceanObs'09* Conference, held September 21-25, 2009, in Venice, Italy, celebrated a decade of progress and is making a major contribution to chart the way forward for the ocean observing system in the coming decade. The first *OceanObs* Conference in 1999 laid the foundation for the GCOS (Global Climate Observing System for Climate) Implementation Plan, an internationally recognized blueprint for the foundational observations (ocean, atmosphere, land) necessary to understand and predict climate on all time scales. This year's conference will build on the predominately physical observations for climate and include plans to integrate with biological and ecosystem observations. The conference website (http://www.oceanobs09.net/) provides additional information. *(Source: Diane Stanitski)*

Nitrous Oxide (N_2O): The Dominant Ozone-Depleting Substance Emitted in the 21st Century by A. R. Ravishankara, John S. Daniel, Robert W. Portmann of the Chemical Sciences Division of the Earth System Research Laboratory, was recently published in *Science* magazine. By comparing the ozone depletion potential-weighted anthropogenic emissions of N_2O with those of other ozone-depleting substances (ODSs), they show that N_2O emission currently is the single most important ODS emission and is expected to remain the largest throughout the 21st century. N_2O is unregulated by the Montreal Protocol. Limiting future N_2O emissions would enhance the recovery of the ozone layer from its depleted state and would also reduce the anthropogenic forcing of the climate system, representing a "win-win" for both ozone and climate. For the abstract of the article, please see: http://www.sciencemag.org/cgi/content/abstract/1176985 *(Source: Hetal Jain)*

NOAA Earth System Research Laboratory Annual Greenhouse Gas Index 2008 finds that the climate-warming gases carbon dioxide and methane continued to increase in the atmosphere last year, despite the global economic slump and a decrease in activities that consume fossil fuels.

ESRL researchers released the annual greenhouse gas index in April, based on atmospheric data collected from 60 sites around the world. Researchers here measured an additional 16.2 billion tons of carbon dioxide (CO_2)—a byproduct of fossil fuel burning—at the end of 2008, compared with 2007's year-end-figures. There were also an additional 12.2 million tons of the potent greenhouse gas methane, according to the new report. Methane's many sources include wetlands, agriculture, natural gas activity, and landfills.

The increases in CO_2 and methane during 2008 are slightly less than those measured in 2007, but fall well within the range of yearly fluctuations from natural changes, according to NOAA experts. CO_2 levels vary from year to year along with plant growth and decay, wildfire activity, and soil conditions. But people's burning of coal, oil, and gas for

transportation, power, and industry create the insistent increase underlying those fluctuations.

At the end of 2008, global average CO_2 concentration was 386 parts per million (ppm). Before the Industrial Revolution began in the 1880s, CO_2 concentration was 280 ppm. *(Source: James Butler)*

The 2008 Arctic Report Card recently released via the following website: http://www.arctic.noaa.gov/reportcard, reported the following changes occurred in 2008:

- Atmosphere - 5°C temperature increases were recorded in Autumn
- Sea ice - Near-record minimum summer sea ice extent
- Biology - Fisheries and marine mammals were impacted by the loss of sea ice
- Ocean - Observed increases in temperature were measured in the Arctic Ocean surface and deep waters
- On and from Greenland - Records were set in both the duration and extent of summer surface ice melt
- On the Land - Arctic-wide permafrost temperatures tended to increase, while snow extent tended to decrease.

The report card is a means of presenting clear, reliable and concise information on recent observations of environmental conditions in the Arctic, relative to historical time series records. Issued annually, it provides a method of updating and expanding the content of the State of the Arctic Report, published in fall 2006, to reflect current conditions.

Material presented in the Report Card is prepared by an international team of scientists and is peer-reviewed by topical experts of the Climate Experts Group (AMAP) of the Arctic Council. *(Source: Kathy Crane)*

The SEARCH (The Interagency Study of Environmental Arctic Change) Sea Ice Outlook for arctic sea ice for September 2009, based on June data, indicates a continuation of low pan-arctic sea ice extent and no indication that a return to historical levels will occur.

The July Sea Ice Outlook Report is based on a synthesis of 16 individual pan-arctic estimates (plus nine regional contributions) utilizing a range of methods.

Although the majority of the responses indicate either persistent conditions or a slight increase over the 2008 sea ice extent, there appears to be about a 20% chance of reaching a new minimum in 2009. The September 2009 extent, as we track it for the rest of the summer, will depend on several factors, including the dynamics of the relatively high levels of thin, first year ice; temperature and wind conditions; and sea level pressure.

The outlook is an international effort to provide a community-wide summary of the expected September arctic sea ice minimum. Monthly reports released throughout the summer synthesize community estimates of the current state and expected minimum of sea ice—at both a pan-arctic and regional scale.

The intent of the SEARCH Sea Ice Outlook effort is not to issue predictions, but rather to summarize all available data and observations to provide the scientific community, stakeholders, and the public the best available information on the evolution of arctic sea ice. *(Source: Diane Stanitski)*

NOAA Program Manager Diane Stanitski to teach *Global Climate Change* at the U.S. Naval Academy this fall. Diane will teach two sections of the upper level course, *Global Climate Change*, to midshipmen in the Oceanography Department at the United States Naval Academy. During the semester, she will incorporate current NOAA science into her presentations, and share her experiences working in the NOAA Climate Observation Division of the Climate Program Office with the students. Lectures and labs will study national policies such as the development of a National Climate Service, and utilize an array of climate data records.

The Navy recently reviewed the curriculum of the U.S. Naval Academy's Oceanography Department and recommended the addition of a course on climate, thereby ensuring that the future Officers will be better prepared to develop and refine climate change adaptation activities in the future. With the Navy establishing Task Force Climate Change (TFCC) in May 2009, and a recent announcement that the Department of Defense (DoD) is proactively taking steps to adapt to climate change and develop an approach to climate change challenges, the timing is excellent to bring NOAA climate science to the Academy. *(Source: Diane Stanitski)*